The Effect of the Doctor–Patient Relationship on Emergency Department Use Among the Elderly

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A B S T R A C T

Objectives. This study sought to determine the rate of emergency department use among the elderly and examined whether that use is reduced if the patient has a principal-care physician.

Methods. The Health Care Financing Administration's National Claims History File was used to study emergency department use by Medicare patients older than 65 years in Washington State during 1994.

Results. A total of 18.1% of patients had 1 or more emergency department visits during the study year; the rate increased with age and illness severity. Patients with principal-care physicians were much less likely to use the emergency department for every category of disease severity. After case mix, Medicaid eligibility, and rural/urban residence were controlled for, the odds ratio for having any emergency department visit was 0.47 for patients with a generalist principal-care physician and 0.58 for patients with a specialist principal-care physician.

Conclusions. The rate of emergency department use among the elderly is substantial, and most visits are for serious medical problems. The presence of a continuous relationship with a physician—regardless of specialty—may reduce emergency department use. (*Am J Public Health.* 2000;90:97–102)

A substantial proportion of emergency department visits are attributable to nonemergency causes that might either have been prevented or handled during a routine office visit.[1] Although there is controversy over the financial consequences of inappropriate use of emergency departments,[2–5] there is no question that excessive use squanders scarce resources and can impair the ability of emergency departments to attend to the critically ill patients for whom they were designed.[6] In addition, emergency department visits exact noneconomic costs for patients, including anxiety, inconvenience, and prolonged waiting times.[7]

Earlier studies have suggested that patients who use emergency departments for nonurgent conditions do so because of worrisome symptoms, lack of a regular source of care, and inadequate medical insurance.[1,8–10] The generalizability of these studies may be limited because they are based on data either from only 1 institution or from convenience samples of emergency department visits. In this study, we examined a year's emergency visits made by all Medicare patients not belonging to managed health care plans in the state of Washington. The study tested the hypothesis that a regular doctor–patient relationship is associated with lower rates of emergency department use when the severity of the patient's illness is controlled for.

Methods

Study Population

This study was based on the medical care utilization patterns of Washington State residents 65 years and older who were Medicare beneficiaries throughout calendar year 1994 and did not belong to a capitated health care plan. The data came from the Health Care Financing Administration's (HCFA's) National Claims History File, an administrative data set that captures diagnostic, therapeutic, and fiscal information about services rendered to Medicare Part B beneficiaries.[11,12]

Encounters and Diagnoses

The Medicare Part B file contains a series of line items, each representing a discrete billable service provided to a Medicare beneficiary. We defined a physician encounter as all line items provided on an outpatient basis to an individual patient on a given date by a single physician. We identified emergency department visits by using the specific place-of-service code for visits in that setting.

Each physician encounter included at least 1 line item with a valid *International Classification of Diseases, Ninth Revision, Clinical Modification* (*ICD-9-CM*) code.[13] For encounters with multiple line items, we selected an index diagnosis from the line item containing the evaluation and management code. For cases without such a code, we selected the index diagnosis from the line item with the highest charge.

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Identifying Physicians

We identified physician specialty on the basis of specialty certification, the primary self-designated specialty captured in the American Medical Association Masterfile, and the specialty recorded by HCFA. Physicians were divided into generalists or specialists; generalists included general internists, family physicians, and general practitioners, and all other physicians were considered to be specialists.

Principal-Care Practitioner

We determined whether or not each patient had an identifiable principal-care physician, a single doctor whom the patient saw for the majority of his or her outpatient visits during the year.[14–18] If a patient split his or her visits equally between 2 physicians, the physician with the highest total charges was designated as the principal-care physician.

Adjustment for Case Mix

We adjusted for case mix by using the Ambulatory Care Group (ACG) system, a method that uses outpatient diagnoses to sort patients into mutually exclusive groups with similar severity of illness.[19] The ACG system is based on studies of the relationship between morbidity, the persistence of illness, and the predicted use of medical resources. In this system, each *ICD-9-CM* diagnosis is mapped onto an exclusive Ambulatory Diagnostic Group (ADG)—a cluster of conditions of equivalent severity—and each patient is assigned to an ACG on the basis of the number and type of ADGs, combined with age and sex.[20] The 32 individual ADGs, along with the patient's age and sex, were used as control variables in logistic regressions to model independent effects of physician–patient relationships on emergency department use, as recommended by the system's developers.[20] We were able to assign ADGs to 99.9% of all patients in the study.

Severity of Condition

We used the method developed by Selby et al. at Kaiser Permanente to assign a relative severity to each condition presenting at an emergency department.[21] For patients aged 1 to 63 years, Selby et al. assigned each emergency department diagnosis to 1 of the following mutually exclusive levels of severity: those visits that were always an emergency, those often an emergency, those sometimes not an emergency, and those often not an emergency. Using their classification system as the base, we expanded the system to include every diagnosis that occurred in a Washington State emergency department at least 10 times during the study year. Two observers independently assigned 1 of the 4 severity levels to all diagnoses not included in the Kaiser study; inconsistencies were resolved by consensus. When agreement could not be reached, the diagnosis was assigned to the higher of the assigned severity levels.

TABLE 1—Emergency Department Diagnoses of Elderly Medicare Patients: Washington State, 1994[a]

Diagnosis	*ICD-9-CM* Code	% Visits (95% CI)
Chest pain	786.50	4.22 (4.09, 4.34)
Congestive heart failure	428.0	2.87 (2.77, 2.97)
Abdominal pain	789.0	2.77 (2.67, 2.87)
Pneumonia	486.0	2.31 (2.22, 2.40)
Syncope	780.2	2.30 (2.21, 2.39)
Respiratory distress	786.09	1.77 (1.69, 1.85)
Dizziness	780.4	1.65 (1.57, 1.73)
Urinary tract infection	599.0	1.55 (1.46, 1.62)
Atrial fibrillation	427.31	1.48 (1.41, 1.55)
Epistaxis	784.7	1.37 (1.30, 1.44)
Transient ischemic attack	435.9	1.29 (1.22, 1.36)
Bronchitis	466.0	1.08 (1.01, 1.14)
Stroke	436.0	1.07 (1.01, 1.14)
Malaise	780.7	1.06 (0.99, 1.12)
Unstable angina	411.1	1.05 (0.99, 1.12)
Pleuritic pain	786.52	0.97 (0.91, 1.03)
COPD	496.0	0.96 (0.90, 1.02)
Angina pectoris	413.9	0.95 (0.90, 1.01)

Note. IDC-9-CM = International Classification of Diseases, Ninth Revision, Clinical Modification; 95% CI = 95% confidence interval; COPD = chronic obstructive pulmonary disease.
[a]Total number of visits = 105 647.

Results

During the study year, 354 782 HCFA beneficiaries received all of their medical care within Washington State, could be assigned to a known address, had at least 1 outpatient visit, were not members of a Health Maintenance Organization (HMO), and were alive at the end of the study year. Of these, 64 093 (18.1%) had at least 1 emergency department visit. The study population made 105 647 emergency department visits, 3.9% of the 2 736 194 outpatient physician visits during the study year. As seen in Table 1, the most common diagnoses reflect potentially serious medical conditions, with cardiorespiratory conditions of particular importance. A total of 74.5% of the visits were attended by emergency department physicians, with general internists, family physicians, and general practitioners together accounting for 18.6% of the emergency department visits.

The rate of emergency department visits varied greatly for the elderly population, depending on the patient's age and severity of illness, as seen in Table 2. Patients 85 years or older had more than twice the rate of emergency department visits as patients aged 65 to 69. However, severity of illness was more important than age, with the rate of emergency department visits of the group with fewer than 4 ADGs differing from that of the group with 10 or more ADGs by more than an order of magnitude. The healthiest among the elderly rarely made emergency department visits, no matter what their age. By contrast, the sickest 20% of the elderly population were more likely than not to make at least 1 emergency department visit during the year.

The majority (58.4%) of patients in this study had a principal-care physician, one doctor who saw them for most ambulatory visits made during the study period. The proportion of patients with a principal-care physician was lower for patients with more visits, but even for those patients with 5 or more visits annually, most (50.8%) had a principal-care physician. For 63.8% of patients with a principal-care physician, generalists filled this role, with the remainder being cared for by specialists.

As seen in Table 3, patients with a principal-care physician were much less likely to have an emergency department visit than patients without such a relationship: 184.6 visits per 1000 patient-years vs 456.9 visits per 1000 patient-years. This relationship held true for every level of

TABLE 2—Emergency Department Visit Rate (Number of Visits per 1000 Person-Years), by Age and Illness Severity: Washington State Medicare Patients, 1994

	Healthiest (≤3 ADGs)			Intermediate (4–9 ADGs)			Sickest (≥10 ADGs)			Total[a]		
Age, y	Population	ED Visits	Rate	Population	ED Visits	Rate	Population	ED Visits	Rate	Population	ED Visits	Rate
65–69	36589	2597	71.0	48425	8852	182.8	11592	9313	803.4	96614	20763	214.9
70–74	29927	1964	65.6	51479	9787	190.1	15106	11937	790.2	96521	23688	245.4
75–79	18893	1226	64.9	41108	8814	214.4	15273	12739	834.1	75340	22791	302.5
80–84	10741	934	87.0	26975	7319	271.3	11905	11242	944.3	49679	19508	392.7
≥85	7274	896	123.2	19902	7258	364.7	9413	10731	1140.0	36628	18897	515.9
Total	103424	7617	73.6	187889	42030	223.7	63289	55962	884.2	354782	105647	297.8

Note. ADG = Ambulatory Diagnostic Group; ED = emergency department.
[a]Includes 180 patients whose severity of illness could not be determined because of missing diagnostic data.

severity of illness. The greatest relative differences in emergency department use were for the healthiest among the elderly, the 29.2% who had no more than 3 diagnostic conditions for which they made an ambulatory visit during the study year. But even the sickest patients had 31.0% fewer emergency department visits if they had a principal-care physician. The impact of this relationship is large: the 58.4% of patients with a principal-care physician made only 36.2% of all the emergency department visits.

The specialty of the physician was much less important than the existence of a principal-care relationship between doctor and patient. Relatively healthy patients whose principal-care physician was a generalist had slightly lower emergency department visit rates than similar patients with a specialist serving as the principal-care physician. This relationship was reversed for the sickest patients. However, the differences were modest and, though statistically significant, of little practical import.

The increased rate of emergency department visits for those patients without a principal-care physician was not simply a function of the fact that these patients made more outpatient visits generally. Although patients without a principal-care physician had a rate of office visits 38.9% higher than that of patients with a principal-care physician, their emergency department visit rate was 147.5% higher. For elderly patients who had a principal-care relationship with a physician, 2.8% of outpatient visits took place in an emergency department; for elderly patients without such a relationship, this figure was 4.9%. Once again, there was little difference between patients whose principal-care physician was a specialist and those whose principal-care physician was a generalist.

The reduction in the rate of emergency department use for patients with principal-care physicians does not seem to be due to a reduction in "inappropriate" visits. Only 15.5% of emergency department visits were classified as "often not an emergency," and the rate varied little between patients with a principal-care physician and those without a principal-care physician.

We further examined the interrelationship among these variables by creating a series of logistic regressions, in which the dichotomous dependent variable was the presence or absence of 1 or more emergency department visits during the year (Table 4). We controlled for case mix by using ADGs, total number of visits, age, sex, Medicaid status, rural/urban location of residence, number of hospitalizations in 1994, and whether or not the patient was in a nursing home at any time in 1994.

The regressions confirmed what we saw in the cross-sectional results. After adjustment, the existence of a principal-care physician was associated with a much lower probability of having an emergency department visit. The relationship persisted even when we restricted the analyses to patients with 5 or more visits during the year. The difference between having a generalist or a specialist as the principal-care physician was small compared with the effect of the relationship itself.

Discussion

Role of the Emergency Department

Emergency departments play a unique and important role in the American health care system. Because of their complexity and expense, there is a continuing attempt to restrict inappropriate use.[22] Appropriateness, however, is in the eye of the beholder,[7] and any system that screens out patients who could have received care in another setting will also erect barriers to people who

Table 3—Rate of Emergency Department Visits (Number of Visits per 1000 Patient-Years), by Doctor–Patient Relationship and Severity of Illness: Washington State Medicare Patients, 1994

	Patients Whose Principal-Care Physician Was—			No Principal-Care	
Severity of Illness	Generalist	Specialist	Either	Physician	Total[a]
≤3 ADGs	41.3	58.2	48.4	158.5	73.6
4–5 ADGs	71.3	98.0	81.2	158.1	110.6
6–9 ADGs, 0–1 major illnesses	141.6	122.8	136.4	214.6	174.9
6–9 ADGs, ≥2 major illnesses	334.9	354.5	342.0	503.0	421.4
>10 ADGs, <3 major illnesses	439.8	407.9	433.4	577.5	519.3
>10 ADGs, ≥3 major illnesses	931.3	874.0	914.1	1325.3	1172.0
Total	193.7	168.5	184.6	456.9	297.8

Note. ADG = Ambulatory Diagnostic Group.
[a]Includes 180 patients whose severity of illness could not be determined because of missing diagnostic data.

have little other recourse for obtaining care.[4,23,24] What is clear is that many emergency department visits, even if appropriate, are discretionary—other alternatives exist where care could be obtained or earlier visits for an emerging condition might prevent the need to visit emergency departments.[24]

Most elderly patients have health insurance. As a result, Medicare is the largest single payer for health care, spending over $200 billion on behalf of its 38.1 million enrollees in 1996.[25] Although some Medicare beneficiaries join HMOs, the majority continue to obtain their care in the fee-for-service environment. Studies of this population allow one to examine the impact of the physician–patient relationship without the distortions imposed by lack of insurance or the strictures of managed care plans.

Table 4—Effect of Having a Principal-Care Physician on Likelihood of Having an Emergency Department Visit: Washington State Medicare Patients, 1994

	Odds Ratio (95% Confidence Interval)[a]	
	All Patients (n = 354 782)	Patients With 5 or More Outpatient Visits (n = 215 104)
Independent variable		
Having a generalist principal-care physician	0.47 (0.46, 0.48)	0.59 (0.58, 0.61)
Having a specialist principal-care physician	0.58 (0.57, 0.60)	0.60 (0.58, 0.62)
Control variable		
Total visits	1.02 (1.02, 1.02)	1.02 (1.01, 1.02)
Medicaid coverage	1.70 (1.65, 1.76)	1.65 (1.58, 1.71)
Remote rural residence	0.89 (0.87, 0.92)	0.89 (0.85, 0.92)
Rural residence adjacent to city	1.11 (1.08, 1.14)	1.08 (1.04, 1.11)
Admitted to nursing home during year	0.99 (0.99, 0.99)	1.01 (1.00, 1.01)
Hospitalized during year	1.18 (1.17, 1.20)	1.18 (1.16, 1.19)
Case mix adjustment		
Age	1.04 (1.03, 1.04)	1.03 (1.03, 1.04)
Female sex	0.98 (0.96, 1.01)	1.01 (0.99, 1.04)
ADGs[b]	. . .	. . .

[a]Results are expressed as odds ratios, which represent the probability of 1 group having a particular outcome as compared to the reference group having that outcome, after adjustment for other potentially confounding factors. For instance, the adjusted odds ratio of 0.47 for patients with a generalist principal-care physician means that patients with a generalist as a principal-care physician are only 47% as likely to have an emergency department visit as patients without a principal-care physician, after control for the other variables in the model.

[b]Thirty-two individual Ambulatory Diagnostic Groups (ADGs) are entered as individual control variables, as specified by the Ambulatory Care Group case mix adjustment system.[19]

Epidemiology of Emergency Department Use Among the Elderly

This population-based study suggests that emergency department use among the elderly is somewhat higher than previously estimated. Weiss and Blustein[16] reported that between 11.9% and 16.1% of the Medicare beneficiaries sampled in the Medicare Current Beneficiary Survey in 1991 said that they had had an emergency department visit in the last year, compared with 18.1% in this study. The National Medical Care Expenditure Survey reported a rate of 13.5% for Medicare beneficiaries.[4] Our findings may be more accurate because they are based on actual emergency department bills as opposed to patient recall or convenience samples.[26–28]

The elderly appear to make more emergency department visits than younger adults. In Selby et al.'s study of patients 63 years and younger, patients aged 45 to 63 years in the control groups made between 158 and 194 visits per 1000 patient-years.[21] Our findings show an overall rate among elderly patients of 298 visits per 1000 patient-years, 61% higher than the rate among younger patients in a managed care environment. The rate is extremely sensitive to severity of illness. Although no risk adjustment system is perfect,[29] the ACG approach shows a strong relationship between increasing severity of illness and emergency department use. For the roughly one third of the elderly with few medical problems, visiting the emergency department is a rare event. By contrast, the most severely ill patients use the emergency department frequently, and most patients with 10 or more discrete medical conditions will make at least 1 emergency department visit during a year.[30]

Impact of the Doctor–Patient Relationship

The fact that patients with a principal-care physician have lower emergency department visit rates, even after sociodemographic factors and health status are controlled for, is powerful confirmation that having a regular physician matters. This study goes beyond previous work in demonstrating that the existence of the relationship is more important than the specialty of the physician. Although our previous work[18] showed that having a generalist as a principal-care physician improves the immunization rate, reduction in emergency department use is not sensitive to specialty per se. The important element is most likely the continuous relationship—which probably allows problems to be discovered and addressed before they reach a point of urgency—and improved access to physicians in their usual office settings.

"Inappropriate" Emergency Department Use

Inappropriateness of emergency department use does not seem like an important issue for the elderly population. Although their rate of emergency department use is considerably higher than that of the population as a whole, very few of the visits are inappropriate. Although Selby et al.[21] found that approximately 30% of the patients visiting Kaiser emergency departments had diagnoses that were considered to be "often not an emergency," only 15% of the patients in this study fell into that category. Given the imprecision of coding schemes for determining appropriateness—and the fact that patients may use the emergency department entirely appropriately even when the final diagnosis does not appear to reflect a serious underlying medical condition—there is probably little to be gained from erecting barriers to the elderly's visits to emergency departments. Rather, encouraging the formation of continuous, long-term relationships with office-based physicians has a salutary effect across the diagnostic spectrum.

Limitations

Data Source. This study is limited by its reliance on an administrative data set. The data set is likely to be both complete and accurate regarding emergency department use by the elderly, since payment depends on

an accurate bill being rendered. Although there is no reason to believe that the diagnostic codes applied to the visits were biased in any particular direction, our ability to determine whether any given visit was appropriate or inappropriate is problematic, even though the technique we use has been validated in another setting.[31] It is also possible that we have misidentified some of the physicians in the study.

Using Principal Care as a Measure of the Doctor–Patient Relationship. Reducing the doctor–patient relationship to a quantitative measure is complex, and literally dozens of indices have been constructed to explore concepts such as continuity of care[32,33] or primary care.[34–37] Our definition of the principal-care physician has the advantage of conceptual simplicity and a lack of ambiguity.[14–17] We tested the robustness of the relationship between having a principal-care physician and a lower likelihood of having an emergency department visit by restricting our analysis to different patient subsets—patients with a minimum number of visits, patients with different disease burdens—and by varying the functional form of the independent variable.

Generalizability. This study was restricted to elderly Medicare beneficiaries in Washington State who were not members of capitated plans, and it may not apply to managed care settings. Regional differences in patterns of emergency department use may also exist. Washington State had slightly higher managed care penetration among the elderly during the study year than in the country as a whole, but 85% of all patients continued to receive fee-for-service care during the study period and were captured in this study. The extent to which the dynamics portrayed here affect the utilization patterns of younger patients is unknown.[31]

Conclusions and Policy Implications

This study has implications both for the American medical care system in general and for the Medicare program in particular. Amid all the turmoil of restructuring the health care system, it is tempting to treat physicians as one industrial input in a production function that produces health care. Particularly in a political climate where national budgetary policy and reductions in the rate of growth of the Medicare program are intertwined, there is a rapid churning in the variety of arrangements devised for the elderly.[38]

The risk of this approach is that it may disrupt a component of medical care that is fragile and difficult to quantify but valuable—the doctor–patient relationship.[39] We already know that Medicare patients are influenced by the financial incentives and constraints of the options available to them, cycling between managed care programs and the fee-for-service sector.[40] Unfortunately, changes in health care plans often lead to changes in providers. This study suggests that in disrupting a sustained relationship between one patient and one doctor, something of value is destroyed, with increased emergency department use an indicator of that disruption. It is intriguing to note that the protective effect of having a sustained doctor–patient relationship is independent of the physician's specialty. In fact, for the sickest patients, unadjusted emergency department use is lower when they have a specialist as their principal-care physician.

It should be emphasized that having a principal-care physician has nothing to do with the structure of the insurance plan through which the patient obtains care. Managed care plans and fee-for-service systems can structure themselves so that patients have predictable access to a regular physician, or they can relegate continuity to a lower order of priority. These findings suggest that patients will be better served by systems and doctors that make an effort to forge strong bonds between individual doctors and individual patients. □

Contributors

R. A. Rosenblatt planned the study, oversaw the analysis, and wrote the paper. G. E. Wright provided statistical consultation and analytic insights. L.-M. Baldwin assisted in creating the operational data set. L. Chan provided valuable insights into the inner workings of the Medicare program and critiqued both the methods and the paper. P. Clitherow assisted in developing the operational methods and provided analytic and programming assistance. F. M. Chen performed many of the early analyses and critiqued the paper. L. G. Hart provided biostatistical and methodological consultation and critiqued the paper.

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References

1. Buesching DP, Jablonowski A, Vesta E, et al. Inappropriate emergency department visits. *Ann Emerg Med.* 1985;14:672–676.
2. Williams RM. The costs of visits to emergency departments. *N Engl J Med.* 1996;334:642–646.
3. Tintinalli JE. Emergency medicine. *JAMA.* 1996;275:1804–1805.
4. Cunningham PJ, Clancy CM, Cohen JW, Wilets M. The use of hospital emergency departments for nonurgent health problems: a national perspective. *Med Care Res Rev.* 1995;52:453–474.
5. Tyrance PH Jr, Himmelstein DU, Woolhandler S. US emergency department costs: no emergency. *Am J Public Health.* 1996;86:1527–1531.
6. Grumbach K, Keane D, Bindman A. Primary care and public emergency department overcrowding. *Am J Public Health.* 1993;83:372–378.
7. Gill JM, Riley AW. Nonurgent use of hospital emergency departments: urgency from the patient's perspective. *J Fam Pract.* 1996;42:491–496.
8. Young GP, Wagner MB, Kellermann AL, Ellis J, Bouley D. Ambulatory visits to hospital emergency departments: patterns and reasons for use. *JAMA.* 1996;276:460–465.
9. Haddy RI, Schmaler ME, Epting RJ. Nonemergency emergency room use in patients with and without primary care physicians. *J Fam Pract.* 1987;24:389–392.
10. Baker DW, Stevens CD, Brook RH. Determinants of emergency department use by ambulatory patients at an urban public hospital. *Ann Emerg Med.* 1995;25:311–316.
11. Lave JR, Pashos CL, Anderson GF, et al. Costing medical care: using Medicare administrative data. *Med Care.* 1994;32:JS77–JS89.
12. Parente ST, Weiner JP, Garnick DW, et al. Developing a quality improvement database using health insurance data: a guided tour with application to Medicare's National Claims History File. *Am J Med Qual.* 1995;10:162–176.
13. *International Classification of Diseases, Ninth Revision, Clinical Modification.* Hyattsville, Md: National Center for Health Statistics; 1980. DHHS publication PHS 80-1260.
14. Aiken LH, Lewis CE, Craig J, Mendenhall RC, Blendon RJ, Rogers DE. The contribution of specialists to the delivery of primary care: a new perspective. *N Engl J Med.* 1979;300:1363–1370.
15. Spiegel JS, Rubenstein LV, Scott B, Brook RH. Who is the primary physician? *N Engl J Med.* 1983;308:1208–1212.
16. Weiss LJ, Blustein J. Faithful patients: the effect of long-term physician–patient relationships on the costs and use of health care by older Americans. *Am J Public Health.* 1996;86:1742–1747.
17. Dietrich AJ, Marton KI. Does continuous care from a physician make a difference? *J Fam Pract.* 1982;15:929–937.
18. Rosenblatt RA, Hart LG, Baldwin L-M, Chan L, Schneeweiss R. The generalist role of specialty physicians: is there a hidden system of specialty care? *JAMA.* 1998;279:1364–1370.
19. Starfield B, Weiner J, Mumford L, Steinwachs D. Ambulatory care groups: a categorization of diagnoses for research and management. *Health Serv Res.* 1991;26:53–74.
20. Johns Hopkins University. *The Johns Hopkins University ACG Case Mix Adjustment System, Version 4.0*. Baltimore, Md: Johns Hopkins University; 1997.
21. Selby JV, Fireman BH, Swain BE. Effect of a copayment on use of the emergency department in a health maintenance organization. *N Engl J Med.* 1996;334:635–641.

22. Steinbrook R. The role of the emergency department. *N Engl J Med.* 1996;334:657–658.
23. Young GP, Sklar D. Health care reform and emergency medicine. *Ann Emerg Med.* 1995; 25:666–674.
24. Kellermann AL. Nonurgent emergency department visits: meeting an unmet need. *JAMA.* 1994;271:1953–1954.
25. Levit KR, Lazenby HC, Braden BR. National health spending trends in 1996. *Health Aff.* 1996;17:35–51.
26. Eagle DJ, Rideout E, Price P, McCann C, Wonnacott E. Misuse of the emergency department by the elderly population: myth or reality? *J Emerg Nurs.* 1993;19:212–218.
27. Strange GR, Chen EH, Sanders AB. Use of emergency departments by elderly patients: projections from a multicenter data base. *Ann Emerg Med.* 1992;21:819–824.
28. Wofford JL, Schwartz E, Timerding BL, Folmar S, Ellis SD, Messick CH. Emergency department utilization by the elderly: analysis of the National Hospital Ambulatory Medical Care Survey. *Acad Emerg Med.* 1996;3:694–699.
29. Lee C, Rogal D. *Risk Adjustment: A Special Report. A Key to Changing Incentives in the Health Insurance Market*. Washington, DC: Alpha Center; 1997.
30. Experton B, Ozminkowski RJ, Branch LG, Li Z. A comparison by payor/provider type of the cost of dying among frail older adults. *J Am Geriatr Soc.* 1996;44:1098–1107.
31. Selby JV. Cost sharing in the emergency department—is it safe? Is it needed? *N Engl J Med.* 1997;336:1750–1751.
32. Freeman GK. Measuring continuity of care. *Fam Pract.* 1987;4:249–250.
33. Smedby O, Eklund G, Eriksson EA, Smedby B. Measures of continuity of care: a register-based correlation study. *Med Care.* 1986;24:511–518.
34. Starfield B. *Primary Care: Concept, Evaluation and Policy*. New York, NY: Oxford University Press Inc; 1992.
35. Starfield B. Continuous confusion? *Am J Public Health.* 1980;70:117–119.
36. Becker MH, Drachman RH, Kirscht JP. A field experiment to evaluate various outcomes of continuity of physician care. *Am J Public Health.* 1974;64:1062–1070.
37. Breslau N. Continuity reexamined: differential impact on satisfaction with medical care for disabled and normal children. *Med Care.* 1982;20:347–360.
38. Greenfield S, Nelson EC, Zubkoff M, et al. Variations in resource utilization among medical specialties and systems of care: results from the Medical Outcomes Study. *JAMA.* 1992;267:1624–1630.
39. Bindman AB, Grumbach K, Osmond D, et al. Preventable hospitalizations and access to health care. *JAMA.* 1995;274:305–311.
40. Morgan RO, Virnig BA, DeVito CA, Persily NA. The Medicare–HMO revolving door—the healthy go in and the sick go out. *N Engl J Med.* 1997;337:169–175.